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ABSTRACT

Guidelines are proposed for reviewing career interest tests, aptitude tests, and achievement tests for sex bias in violation of Title IX of the Education Amendments 1972. To review the tests, several recommendations are made: analyze the test; review the technical manuals and interpretive information; examine and classify test items, reading passages, and illustrations; and review the interpretation of sex differences in performance. School personnel are also given suggestions on activities to undertake if tests are not sex fair: communicate test limitations to students; provide a full range of career choices; support counseling and career education programs; use a different test; inform the publisher of needed revisions; reduce harmful test effects through in-service programs or additional interpretive materials; and assist teachers in constructing sex-fair locally produced tests. (MH)

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what to do about sex bias in testing

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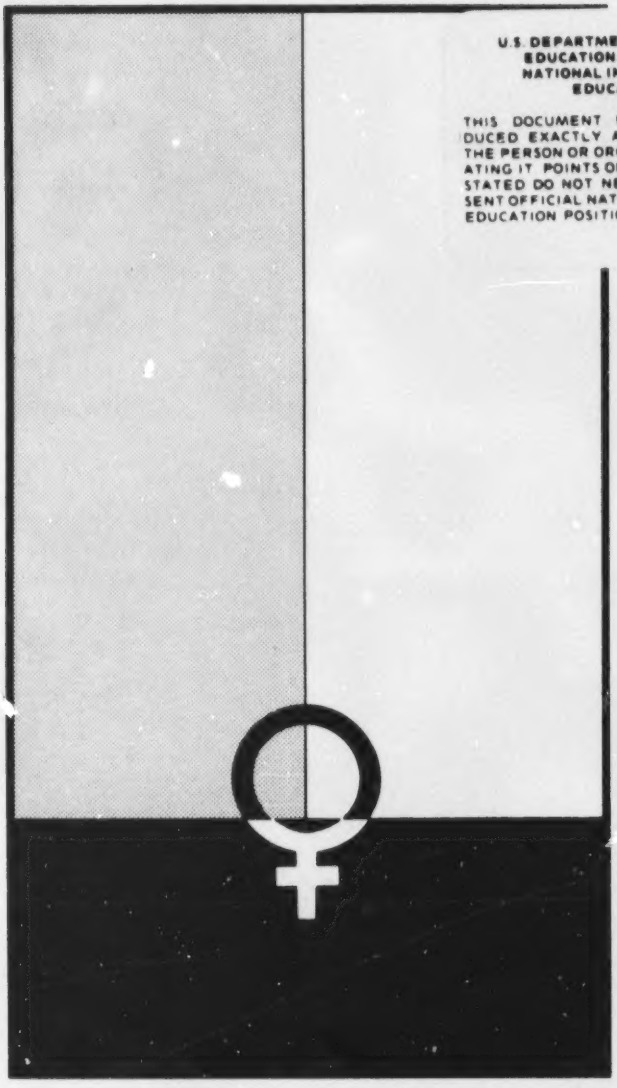

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WOMEN'S EDUCATIONAL EQUITY COMMUNICATIONS NETWORK

what to do about sex bias in testing

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1979

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DID YOU KNOW THAT:

- The context of math items influences the scores of high school girls on tests of mathematical ability?[1]
- The specific activities of career interest inventory items affect the scores of girls in areas such as science and business?[2]
- Tests labeled "mechanical aptitude" may exclude girls from training courses on the basis of test items that reflect sex-linked experiences?[3]

Why is it important that we concern ourselves with this kind of evidence of sex bias in educational tests?

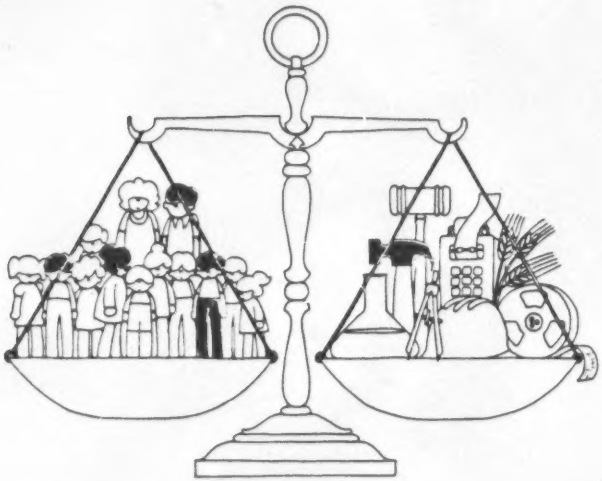
- Math test scores may reinforce the stereotype of women as being less able to work with numbers, and therefore less suited to enter occupations requiring preparation in mathematics. Fewer girls continue taking mathematics courses in high school, and mathematics thus becomes a critical filter,[4] limiting the opportunities for women to enter a wide range of business and professional fields.
- Career interest inventories are routinely taken by millions of women and men annually, and the results are seriously considered for career-related decisions by students, parents, teachers, and guidance personnel. Career interest inventories, if biased, can serve to place limits on the occupational attainments of women--perpetuating the extensive sex segregation of occupations.
- Often tests of "aptitudes" or learned abilities are used to assist students in selecting vocational courses. To the extent that these tests reflect different experiences for girls and boys, the tests can perpetuate the traditional pattern of sex-segregated vocational courses,[5] thus limiting the choices women consider.

Sex discrimination has been prohibited by law in educational institutions that receive Federal support. Yet, there are still many educational policies, procedures, and practices that reinforce sex-role stereotypes and reflect prejudiced views of women's achievements, interests, and abilities. Title IX regulations have specific requirements to eliminate sex bias in the use of such appraisal and counseling materials as career interest inventories and other measures. The regulations state:

> A recipient which uses testing or other materials for appraising or counseling students shall not use different materials for students on the basis of their sex or use materials which permit or require different treatment of students on such basis unless such different materials cover the same occupations and interest areas and the use of such different materials is shown to be essential to eliminate sex bias. Recipients shall develop and use internal procedures for ensuring that such materials do not discriminate on the basis of sex. Where the use of counseling tests or other instruments results in a substantially disproportionate number of members of one sex in any particular course of study or classification, the recipients shall take such action as is necessary to assure themselves that such disproportion is not the result of discrimination in the instrument or the applications.

Because tests are given for a number of purposes, there is no one procedure or definition that will quickly tell whether an educational test is bias-free in relation to women. Thus, Title IX Coordinators, teachers, principals, counselors, Vocational Education Sex-Equity Coordinators, and others concerned with the sex fairness of tests used in schools must examine each test individually from several perspectives. The questions and answers that follow are focused on how to review three types of tests--career interest, aptitude, and achievement

--and how to use each in a sex-fair manner.* The emphasis is on establishing procedures for reviewing tests for sex bias, and on providing supplementary activities to ensure sex-fair use of tests.



*These recommendations are given in greater detail in Sex Bias in Testing: A Review with Policy Recommendations by Carol Kehr Tittle (San Francisco, CA: Women's Educational Equity Communications Network, Princeton, NJ: ERIC Clearinghouse on Tests, Measurements, and Evaluation, 1978). Available from WEECN, 1855 Folsom Street, San Francisco, CA 94103. $3.50 prepaid.

HOW CAN CAREER INTEREST TESTS BE REVIEWED FOR SEX BIAS?

For career interest inventories the most important procedure school districts may establish is the review of all tests used in the career/occupational area for sex bias. Certain career interest tests have been analyzed for sex bias, and guidelines have been developed to assist in the review process. The National Institute of Education's Guidelines for Assessment of Sex Bias and Sex Fairness in Career Interest Inventories[6] suggests some detailed procedures for looking at these tests. They include:

For the actual inventory:

- The same form should be used for both women and men unless it is empirically proven that separate forms minimize bias.
- Scores by sex should be given for all occupations and interest areas.
- Item pools at the inventory and scale levels should reflect experiences and activities equally familiar to each sex.
- Occupational titles should be gender-neutral.
- Use of the generic "he" should be eliminated.

For technical information:

- Technical manuals should describe how the inventory meets the NIE guidelines.
- The rationale for utilizing separate scales for females and males should be given.

- The same vocational areas should be indicated for each sex--even if it is empirically demonstrated that use of separate inventory forms are more effective in minimizing sex bias.

- Sex composition of the criterion and norm groups should be indicated.

- Criterion and norm data should be updated every five years.

- The information on career options distributions suggested for each sex should be provided.

- The validity of interest inventories for minority groups should be investigated.

For interpretive information:

- Interpretive materials should point out that vocational interests and choices of women and men are influenced by many environmental and cultural factors--including early socialization, sex-role expectations, and home-versus-career conflict.

- Orientation to the inventory should encourage respondents to examine stereotypic sets toward activities and occupations.

- The user's manual should state that all jobs are appropriate for qualified persons of either sex, and should attempt to dispel myths about women and men based on sex-role stereotypes.

- Interpretive materials should encourage initial experiences in undeveloped interest areas.

- Case studies and examples should represent women and men equally, and include examples of each in non-stereotypic roles.

A review of most career interest inventories shows they do not meet all the NIE guidelines or Title IX regulations. Some interest inventories have two sets of empirical or occupation-based scales--one based on female occupational groups, and one on male. Even though both female and male scales are reported to each student, the very presence of a separate scale group for each sex reinforces a sex-linked view of occupations. In other inventories, homogeneous or rationally-derived basic interest area scales will not result in similar career distributions suggested to girls and boys unless same-sex norms or carefully constructed item pools are used (see Note 2).

WHAT CAN BE DONE IF CAREER INTEREST INVENTORIES ARE NOT SEX FAIR?

Since few interest inventories meet all the NIE guidelines and Title IX regulations (and, therefore, are not sex fair), school districts must take an affirmative position. This position should recognize the limitations of the inventories, provide a full range of career choices, and develop a counseling back-up[7] for students seeking nontraditional activities and jobs.

The limits of career interest inventories can be communicated to students by giving them a statement on sex-biased inventories. Statements on sex stereotyping of occupations should be included as part of the strategy to provide a full range of career choices (e.g., many occupations are traditionally classified as appropriate for females or males only--secretaries, nurses, and elementary school teachers are female; scientists, mathematicians, and electricians are male). The range of career choice may also be increased by examining clusters of career choices, and by expanding consideration of occupations beyond those for which occupational scales are available.

Counseling and career education programs have an important role in supporting students expressing an interest in nontraditional jobs. These students may experience pressure from peers, parents, teachers, or counselors to conform to more traditional job choices. Support for nontraditional career choices can be provided in individual or group discussions by encouraging peer support groups and by meeting with parents. Information on equal educational and employment opportunity regulations needs to be made available. Students may be given the opportunity to visit role models of the same sex in nontraditional occupations, and to try activities more typically found within nontraditional occupations. In-service workshops may be developed to assist school staff in designing and implementing sex-fair counseling and career education. Teachers should have opportunities in class discussions of subject areas to identify female role models, and to emphasize that all occupations are open to qualified persons of either sex.

Recent research on the effects of interest inventories provides evidence that inventories by themselves will probably not encourage females to consider a wide range of occupations--to explore rather than narrowly focus on occupations traditionally feminine. This limiting of choices to traditionally female occupations will continue the current status of women as <u>occupationally</u> segregated, with resulting lower salaries and

wages. To the extent that interest inventories are used in schools, they must be interpreted within a sex-fair approach to career development for women.

HOW CAN APTITUDE TESTS BE REVIEWED FOR SEX BIAS?

Aptitude tests are used in high schools and colleges to assist in counseling students and selecting students for college entry. In addition, aptitude tests are often used in the employment selection process. The definition of aptitudes presented to counselors and students emphasizes the capacity to learn--and the use of these tests in making predictions of school or job success. The emphasis on measuring the individual's capacity for future learning, plus predicting future achievements makes the use and interpretation of scores critical for students.

Perhaps the best known aptitude measures are the Differential Aptitude Tests (DAT).[8] The titles of the tests in the DAT suggest the differences between educational achievement tests, interest measures, intelligence measures, and aptitude tests. The DAT has the following tests:

- Verbal reasoning
- Numerical ability
- Abstract reasoning
- Clerical speed and accuracy
- Mechanical reasoning
- Space relations
- Spelling
- Language usage

Thus, there is a wider range of tests of abilities in an aptitude battery than in intelligence tests, achievement tests that reflect school curricula more directly, or interest measures that are concerned with linking occupations and preferences.

Aptitude tests may be reviewed for sex bias in two main areas:[9]

- Overt sex bias in the content of questions and illustrations
- The interpretation of sex differences in performance.

The category system suggested for educational achievement tests is also appropriate here (see next section). Test items and interpretive materials should be reviewed for sex-role stereotypes of women and minorities--and for equal representation of both females and males in illustrations and individual items.

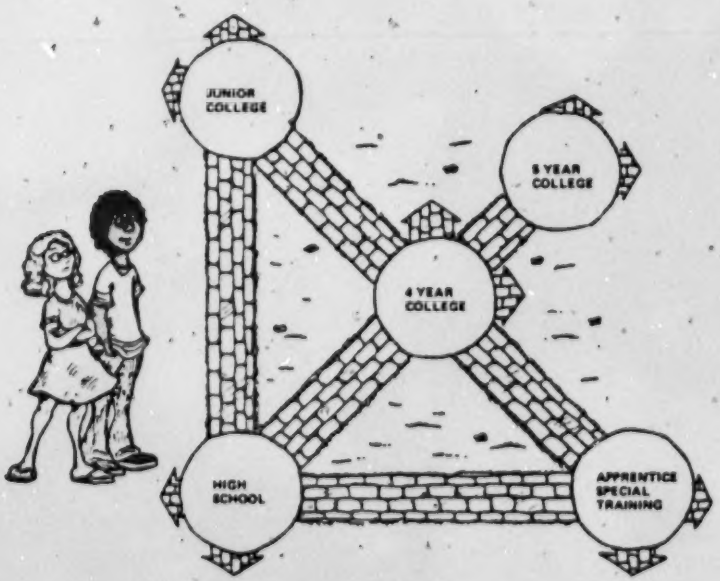
The mean scores for females and males at each grade or age level should be compared. Review committees may check the data by looking at tables of norms to determine the scores equivalent to the 50th percentile for each sex. Where there are raw score differences, it indicates that some items are being passed by a higher proportion of one sex.

The test technical manual should then be reviewed to determine the procedures test publishers have followed in selecting items (asking such questions as: Were item proportions passing compared for females and males? And, exactly which decision rules were used to include items in the test?). If these data are not available, the review committee should write the publisher to obtain the information--and to satisfy themselves that such differences remain only after efforts to balance easy and difficult items for females and males have been made.

For a variety of reasons--such as stereotyping of activities appropriate for boys and girls, and socialization to preferred sex-typed activities--sex differences appear on some tests in aptitude batteries. This is particularly true in clerical, spatial relations, and mechanical reasoning tests. Where performance differences are found, test publishers must provide same-sex norms for interpreting test scores.

Scores or both same-sex and opposite-sex norms should be available for each student, and the difference in norms should also be used to interpret scores. The differences may point out to females that their abilities may be limited by past experiences rather than innate abilities.

Tests called "mechanical aptitude" often assess past experience.[10] When individuals have not had the same opportunity to learn mechanical principles, for example, these scores do not accurately predict the individual's capacity for future learning. The emphasis on prediction--as with interest inventories--is not useful or warranted when experiences tend to be limited by gender. Increased emphasis should be given to assisting females to explore their skills via a wide variety of courses and activities that are occupationally related. It may prove useful to have girls estimate their experience related to answering questions on verbal, mathematical, spatial, and mechanical reasoning tests to help them interpret differences in performance when comparing same-sex and opposite-sex norms.



WHAT CAN BE DONE IF APTITUDE MEASURES ARE NOT SEX FAIR?

Where sex-role stereotyping appears in test content or interpretive materials, school staff may change to another aptitude test (if available). If this is not a viable alternative, the publisher should be informed that the tests need revision. The school's use of the test should then concentrate on reducing any harmful effects. In-service courses can assist both general teachers and vocational education teachers to understand the effects of experience and sex-typed expectations that have resulted in sex segregation in vocational education. Interpretive materials, discussions, and activities designed to reduce the effects of past stereotyping and socialization of sex-appropriate experiences may be provided for students.

The additional materials and activities are critical when aptitude measures are used to help students plan vocational education and to make occupational choices. The new regulations on sex discrimination for the Vocational Education Act (VEA) contain specific requirements on counseling, recruiting, and selecting students for vocational education programs. These regulations are an important addition to the Title IX regulations already available.

Of particular concern are these points which show girls and women in sex-segregated areas:

- Course enrollment
- Vocational preparation
- College major
- Labor force participation data

Women are underrepresented in crafts and trades, mathematics, and sciences, and in such major professions as business, law, and medicine. Procedures to encourage females to enter nontraditional areas are required to ensure that educational testing does not contribute to inequity in educational opportunities.

HOW CAN ACHIEVEMENT TESTS BE REVIEWED FOR SEX BIAS?

Review for Test Content

Until recently, educational achievement tests had items and reading passages that portrayed women almost exclusively as homemakers or engaged in the pursuit of hobbies (e.g., Mrs. Jones--the president of the garden club). Some publishers now review all test items for sex-role stereotyping of females and males. However, not all tests have been revised to be free of sex role stereotyping. Additionally, classroom tests need to be reviewed for sex fairness. Therefore, a first step in reviewing any test for sex fairness is to use a process to classify the presentation of females and males in test items, reading passages, and pictures.

Several category schemes are available.[11] In a number of these schemes, sex bias is examined by counting the number of times females or males are portrayed in the test and illustrations as:

- Adults versus children,
- Main and secondary characters,
- Home or work environments,
- Active or passive behavior and emotions (e.g., nurturant, problem solving, or physically exertive), and
- Female or male traditional and non-traditional occupations and activities.

The tally in the categories call attention to the fairness and equality in representing men and women in different roles, occupations, and activities.

For locally written or classroom tests there is the next step--assisting teachers and others responsible for classroom materials to write tests that are free of sex-role stereotyping, and that positively represent

activities and occupations as being open to both sexes. There are guides for writing sex-fair materials available from publishers and professional associations. These guides typically emphasize that sex-neutral titles for occupations should be used (e.g., mail carrier for postman and police officer for policeman).

Another writing problem for revising materials to make them sex fair is the standard use of the generic "he" for pronouns when referring to nouns that do not identify a specific person (for example, the principal ...he and the teacher...she). Such usage reinforces stereotypes. Often, a simple change from singular to plural nouns can "neutralize" the view of the occupations as exclusively female or male, since the pronoun that clarifies the word becomes "they." Alternative strategies to using plural nouns and pronouns are to write questions and stories that represent both sexes with the same roles, activities, and emotions, and to write or revise stories so that the main characters vary between male and female.

Another source of sex-role stereotyping arises in situations in which famous persons from the past or present are the focus of items or stories. Women who have contributed in science and the arts are not well known. More determination is required on the part of writers and classroom teachers to be sure that women--both majority and minority--are included in test material. The importance of positive, equal representation of women and minorities cannot be overemphasized. Tests are a part of the educational environment, and the effects of tests, books, classroom activities, and illustrations are cumulative--thus adding to the portrayal of women of all ages and minority groups. Teachers, curriculum supervisors, school staff, parents, and students who review educational tests for sex fairness have an important role to play in expanding choices and options for women.

Review for Sex Differences in Performance

Achievement tests should also be reviewed for sex differences in performance. That is to say, do females and males have the same or different average scores? There will typically be few, if any, instances of sex differences in average performance on a total test score for females and males through the elementary and junior high school years. However, it is easy to check if there are any differences by computing the average (mean) score for both female and male students. If there are differences, the items themselves should be examined to locate the items which have different proportions of females and males answering correctly. It may be found that the item content is more familiar to males than to females (or vice versa), and a more equal balance of content familiarity is required.[12]

A number of test publishers now include this type of analysis when constructing achievement tests. School staffs should review test manuals to ensure such an analysis has been made. They should also be sure that the test items are sex fair in performance (or at least balanced to attain sex fairness across the entire set of items), as well as being free of the previously mentioned stereotyping.

Although the analysis of classroom tests requires more time on the part of teachers or reviewers, it may be worthwhile to check for score differences in such areas as mathematics and science--particularly at the high school level. Research has shown that apparent familiarity with the setting of a problem may affect the scores of males and females (for example, are "bolts and tires" or "cooking and laundry" the content areas upon which the problem-solving process in an item is based?).

WHAT CAN BE DONE IF AN ACHIEVEMENT TEST IS NOT SEX FAIR?

Activities differ for the types of tests found in a local school district. Tests written by teachers or other school staff should be revised (an in-service work-

shop may be used to assist teachers and others in writing sex-fair tests, as well as other instructional materials). School districts and individual teachers do have the power to exert control over the sex fairness of tests in their classrooms.

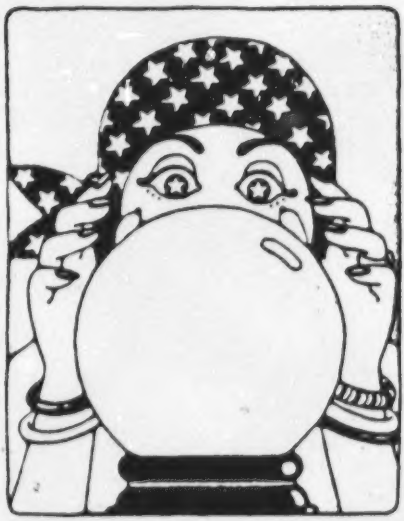
School districts have less control over the sex fairness of tests developed by such diverse groups as publishing companies or national and state level testing programs. However, the following two policies may be followed:

- Cease purchasing tests that appear sex-biased in content or performance
- If this is not possible, then continue to use the tests, but provide "compensatory" or "affirmative" activities and discussion to ensure the greatest degree of sex-fairness possible.

In some cases, a school district may readily change from a sex-biased test to one that is sex fair--and valid for local curriculum and objectives. School staff may also write test publishers concerning changes needed to make tests sex-fair. However, when sex-biased national or local tests must be used, such bias may be balanced by activities and discussions designed to help students overcome sex-role stereotyping (whether in terms of behaviors, activities, or occupations). If, for example, reading passages in a particular test include only male astronauts or scientists, then identify additional stories or focus the discussion on women working in these occupations.

In summary, when an achievement test is not sex fair, policies should focus on changing them to sex-fair tests and, when required, providing activities designed to counter sex bias. In-service workshops on writing sex-fair tests and "compensatory" or "affirmative" classroom activities are the keys to countering sex bias in educational achievement tests.

CONCLUDING REMARKS



While the emphasis here has been on issues and policies in relation to sex bias and educational tests, the sets of procedures suggested for local review and data analysis will contribute to the better use of educational tests in general. Too often tests are given and scores obtained and interpreted without an examination of the individual items in the tests and the student's performance at the item level. This focus will contribute to the integration of tests with curriculum and instruction on a broader basis. In this sense, considerations of educational equity for women contribute to improved education.

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[9]A third area, the adverse impact of aptitude tests in selection, is described in Tittle, op. cit., pp. 43-45.

[10]Cronbach, op. cit.

[11]Tittle, op. cit., pp. 14-18 for examples.

[12]Tittle, Ibid., pp. 19, 21-22.

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RR-2 *Girls and Women in Sports* ..... Free

RR-3 *Disabled Women and Equal Opportunity* ..... Free

RR-4 *Numerical Data Tapes Relevant to Women's Educational Equity* ..... Free

RR-5 *Expanding the Options of Older Women* ..... Free

RR-6 *Black Women and Education* ..... Free

ALL ORDERS MUST BE PREPAID